FOIA

EPA-R6-2013-007110

1 of 3

Corrective Action at

8701 Park Place Blvd.

Houston, TX 77017

C Fin 9/11/01

IHW 31052 CO

Bayer

CERTIFIED MAIL 7000 0600 024 7025
Return Receipt Requested

TXD084972777

Bayer Corporation
100 Bayer Road
Pittsburgh, PA 15205-9741
Phone: 412 777-2000

August 10, 2001

Registration and Evaluation Division
Waste Evaluation Section
Data Analysis and Management Team, MC-129
Texas Natural Resource Conservation Commission
P.O. Box 13087
Austin, TX 78711-3087

Subject: Solid Waste Registration No. 31052

Dear Data Analysis and Management Team:

Bayer Corporation received your July 23, 2001 reminder letter concerning the 2000 Annual Waste Summary report for the facility with the solid waste registration number referenced above. This registration number was for a former Bayer Corporation facility at the following address:

8701 Park Place Blvd
Houston, TX 77017-2514

11-19-01 SC

Bayer Corporation no longer has production operations at this site. All production operations at this site were halted in 1998 and decontaminated. The production facilities were dismantled and decommissioned in 1999 and 2000, and the property was sold to Kemiron Inc. in August 2000. Apparently, due to an oversight, Bayer did not file a request with the Agency to place the facility on "Inactive" status as a waste generator. However, Bayer did notify the agency through the STEERS system that all but one waste stream listed for the facility was "Inactive" as of July 27, 2000. A copy of the confirmation notice is attached.

Due to the absence of production at the site and the on-going demolition underway, the vast majority of wastes removed from the site in 2000 were non-hazardous concrete construction debris, scrap metal, and office/paper trash. A small amount of Class 2 soil (838 cubic yards) was remediated from three Solid Waste Management Units (SWMUs). If you require an Annual Waste Summary filing for the construction debris or Class 2 soil, please let me know.

R I 2468 10 18

6522 UH 8/1 SC

Note that during this time Bayer has been in close contact with the Corrective Action Section of the Remediation Division of TNRCC, closing out a number of the waste management units at the site. In fact, we received an approval dated August 1, 2001 for closure of 16 SWMUs and 4 AOCs at the site. Copies of the relevant TNRCC approvals are attached. We had left open the NOR pending the approval of the closures of these units. When the final deed recordation is approved for these units, Bayer will request that the TNRCC update the NOR, closing out all units at the site.

If you have any questions or need additional information, please contact me at 412-777-4871.

Sincerely,

Joel E. Robinson
Manager, Solid Waste and Remediation Programs
Corporate Environmental Control
Bayer Corporation

JER01030/cno

Attachments

MILES INC HOUSTON
HOUSTON

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04

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MILES INC HOUSTON
HOUSTON, TX 77017

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SAMPLING VISIT REPORT FOR
[redacted] CHEMICAL CORPORATION
HOUSTON, TEXAS
[redacted]

Prepared for:

U.S. Environmental Protection Agency
Region VI
1445 Ross Avenue
Dallas, Texas 75202

Prepared by:

A. T. Kearney, Inc.
3 Lagoon Drive, Suite 170
Redwood City, California 94065

and

Harding Lawson Associates
6220 Westpark Drive, Suite 100
Houston, Texas 77057

In response to:

Contract No. 68-01-7374
Work Assignment No. R26-01-37

January 1988

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TABLE OF EXHIBITS

1.0 INTRODUCTION

This section of the Sampling Visit (SV) Report presents the purpose of the SV and includes its relationship to the Preliminary Review/Visual Site Inspection (PR/VSI) Report. The contents of the other sections of this report are also described.

1.1 Purpose and Scope of This Report

The purpose of this report is to document the field sampling activities, to present the analytical data which resulted from the SV, and to make final conclusions and suggestions based on the sampling results.

The 1984 Hazardous and Solid Waste Amendments (HSWA) provided the EPA new authority to require comprehensive corrective actions on Solid Waste Management Units (SWMUs) and other areas of concern at RCRA facilities. This SV was conducted as part of a RCRA Facility Assessment (RFA) under the corrective action program. Prior to the SV, a PR and a VSI of the Denka Chemical Corporation (Denka) facility had been conducted.

This report presents the results of the SV conducted at the Denka facility, which is located at Highway 225 and Goodyear Road, along the Houston Ship Channel, in Houston, Harris County, Texas. Established in 1940, the 28-acre facility is a chemical manufacturing plant consisting of two distinct operating units which produce polymers from the chemical processing of petrochemical monomer feedstock.

The neoprene unit is used for the manufacture of neoprene rubber, and the maleic acid unit is used for the manufacture of maleic anhydride. Both of these units generate a variety of hazardous constituents.

The PR/VSI Report, prepared by A. T. Kearney, Inc. and Harding Lawson Associates (HLA), recommended RCRA Facility Investigations (RFIs) for 14 SWMUs and soil sampling at 7 SWMUs. EPA Region VI approved sampling for six SWMUs. The sampling was conducted on August 5, 1987, by an HLA field team. The results of the sample analyses are presented in this report. The final conclusions and suggestions presented in this report have been made based on the sampling results.

1.2 Contents

This report includes the following major topics:

- Description of the sampling activities and quality control (QC) procedures;
- Analytical results of the SV; and
- Conclusions and suggestions.

Section 2.0 contains a description of the SV, information relating to sampling activities at the facility, and QC procedures undertaken during sampling. Section 3.0 presents the analytical results of the sampling. Section 4.0 details specific conclusions and suggestions for each SWMU and area of concern.

2.0 SAMPLING VISIT

This section of the SV report describes the procedures followed while sampling, and details pertinent related information.

2.1 Description of Visit

The field team arrived at the Denka facility at 8:15 a.m. Central Daylight Time (CDT) on August 5, 1987. The field team met with Denka's Dr. Al Besozzi to discuss the purpose of the SV and to review the Sampling Visit. During the meeting,

- Dr. Besozzi requested that samples be split with the facility;
- The sampling team viewed a safety orientation tape outlining the safety precautions required for working on site; and
- Dr. Besozzi reviewed the chemicals found on site and described their locations.

The field team consisted of the following members:

Eric White, HLA
Field Team Leader, Environmental Scientist

Madeline Mauk, HLA
Field Team Member, Environmental Engineer

Marvin Unger, K. W. Brown and Associates, Inc.
Quality Control Officer

Dr. Besozzi accompanied the field team during all the sampling activities. The field team split samples with Dr. Besozzi at every sampling location.

The SV at the Denka facility was conducted in one working day, August 5, 1987. The weather conditions during the SV consisted of clear, partly cloudy skies and high humidity, with an average daytime temperature of 95°F.

When they arrived at the Denka facility, members of the sampling team identified sampling locations using a facility map which is provided as Exhibit 2-1. A Photo-Vac meter was used for safety purposes to measure organic vapors at background levels and at each sampling location.

Special Analytical Services (SAS) samples for inorganic analysis were submitted to the Weyerhauser Laboratories under SAS Case Number 3195F. SAS samples for organic analysis were submitted to Science Applications International Corporation (SAIC) Laboratories under SAS Case Number 3195F. Routine Analytical Services (RAS) samples for organic and inorganic analysis were submitted to Spectrix Laboratories under RAS Case Number 7777. Table 2-1 summarizes the sampling performed at the Denka facility.

Sampling at the Denka facility involved surface soil collection with stainless steel scoops. All scoops were appropriately decontaminated in the HLA laboratory with Alconox detergent and a distilled water rinse. The scoops were wrapped in plastic bags to prevent contamination prior to use. Since scoops were dedicated to each sampling location,

SAMPLING LOCATIONS

S01 LAKE HAUSENSTEIN

S02 LAKE HAUSENSTEIN

S03 MALEIC POND

S04 IMHOFF POND

S05 EMPTY DRUM STORAGE AREA

S06 WASTE PILE

S07 PROCESS WASTE STORAGE AREA

S08 BACKGROUND SAMPLE

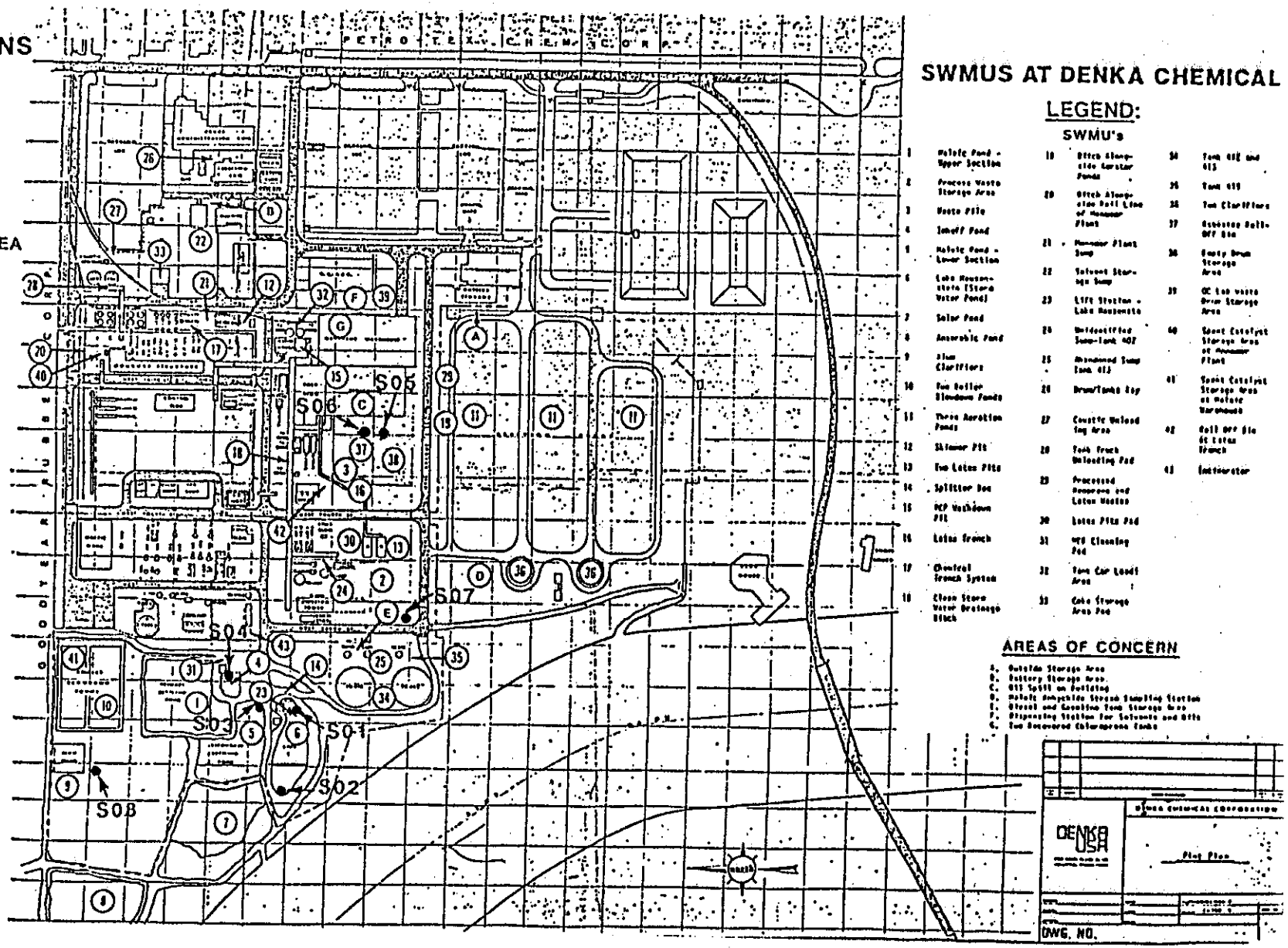

EXHIBIT 2-1

Table 2-1

Summary of Sampling Activities

Sampling Order	Sample Location	Media Sampled	Date/Time Sampled 08-05-87	Sampling Method	Sample Depth	Type of Container Used	Type of Sampling Equipment Used	Analyses Requested	Sample ID No.	Preservatives Used
1	Lake Hausenstein	Soil	10:10 am	Grab	0 to 2 inches	A, B	Stainless Steel Scoop	VOA, Semi-VOA, Metals	S01	None
2	Lake Hausenstein	Soil	10:50 am	Grab	0 to 2 inches	A, B	Stainless Steel Scoop	VOA, Semi-VOA, Metals	S02	None
3	Maleic Pond	Soil	11:38 am	Grab	0 to 4 inches	A, B	Stainless Steel Scoop	VOA, Semi-VOA, Metals	S03	None
4	Imhoff Pond	Soil	12:30 pm	Grab	0 to 4 inches	A, B	Stainless Steel Scoop	VOA, Semi-VOA, Metals	S04	None
5	Empty Drum Storage Area	Soil	2:55 pm	Grab	0 to 3 inches	A, B	Stainless Steel Scoop	VOA, Semi-VOA, Metals	S05	None
6	Waste Pile/ Neoprene Area	Soil	3:10 pm	Grab	0 to 2 inches	A, B	Stainless Steel Scoop	VOA, Semi-VOA, Metals	S06	None
7	Landfill Area	Soil	3:45 pm	Grab	0 to 2 inches	A, B	Stainless Steel Scoop	VOA, Semi-VOA, Metals	S07	None
8	Background	Soil	4:15 pm	Grab	0 to 3 inches	A, B	Stainless Steel Scoop	VOA, Semi-VOA, Metals	S08	None
9	Equipment Blank	Water	4:55 pm	N/A	N/A	C	Stainless Steel Scoop	VOA, Semi-VOA, Metals	S09	None

N/A = Not Applicable
VOA = Volatile organics analysis
A = Two 8-ounce wide-mouth glass jars
B = Two 120-ml glass VOA jars
C = One 1-gallon amber glass jug, two 40-ml VOA vials, one 1-liter polyethylene bottle

field decontamination was not necessary. The sampling equipment was rinsed with distilled water prior to use at each sampling location (see Photo A.1).

An equipment blank was collected for analysis by rinsing a decontaminated scoop with distilled water into appropriate containers. This sample was submitted as S09.

Photographs of sampling activities were taken at all sampling locations and are included in Appendix A.

2.2 Sampling Activities

All samples were collected using stainless steel scoops and spatulas. Sufficient material was collected at each sampling location to fill two 120-milliliter glass vials for volatile organics analysis, one 8-ounce glass jar for organics analysis, and one 8-ounce glass jar for metals analysis. All sample containers were labeled with the sample location and identification number, date and time of collection, and required analysis. The sample containers were then wiped clean with a paper towel and placed in plastic bags on ice in an insulated cooler. In addition, the field team filled four 8-ounce glass jars provided by the facility for their split sample. Each sample hole was then backfilled with the remaining soil, and the sampling equipment was placed in plastic bags. The field team then removed their gloves and discarded them in a plastic bag for disposal.

The first sample (S01) was collected at the delta of the inflow of Lake Hausenstein (SWMU 6), approximately 2 feet above the surface of the water (see Photo A.2). The sample was

collected from a depth of 0 to 2 inches (see Photo A.3). The embankment soil was visibly contaminated with a dark brown substance (see Photos A.4 and A.5).

Sample S02 was collected at the left side of the old discharge pipe (facing the lake), approximately 2 feet above the water level on the embankment of Lake Hausenstein (SWMU 6, see Photo A.6). The sample was collected from a depth of 0 to 2 inches (see Photo A.7). The soil appeared tan to dark brown/black, with neoprene (rubber) in the soil (see Photo A.8).

Sample S03 was collected from the embankment of the Maleic Pond (SWMU 5, see Photo A.9), approximately 1 inch above the water level (see Photo A.10). The sample was collected from a depth of 0 to 4 inches. The soil appeared tan to dark brown/ black in color with visible contamination (an oily sheen) encountered throughout the depth of the sample (see Photo A.11).

Sample S04 was collected from the runoff or washdown area between the Imhoff Pond (SWMU 4) and the Heat Exchanger Bundle Cleaning Pad (see Photo A.12). The sample was collected from a depth of 0 to 4 inches (see Photo A.13). The soil appeared black to grayish black in color, with visible contamination from an oily black substance (see Photo A.14).

The field team and QC Officer then inspected the Boiler Blow-down Pond (SWMU 10) and found no visible signs of contam-ination. The field team and QC Officer determined that,

since only one water sample had been authorized, it should be used for the equipment blank. No sample was taken at the Boiler Blowdown Pond.

Sample S05 was collected from the Empty Drum Storage Area (SWMU 35, see Photo A.16). The sample was collected from a depth of 0 to 3 inches (see Photo A.17). The soil appeared black to grayish black in color, with a tar-like texture from 0 to 1-1/2 inches. The soil appeared grayish black to a depth of 3 inches (see Photo A.18).

Sample S06 was collected from the Waste Pile/Neoprene Area (SWMU 3, see Photo A.19). The sample was collected from a depth of 0 to 2 inches (see Photo A.20). The soil appeared yellow to brown/black in color, with visible neoprene contamination (see Photo A.21).

Sample S07 was collected from the Process Waste Storage Area (SWMU 2) near the cooling tower in an area showing visible contamination (see Photo A.22). The sample was collected from a depth of 0 to 2 inches (see Photo A.23). The soil appeared black to tan in color, with visible neoprene contamination (see Photo A.24).

Sample S08 is the background sample, and was collected from the wooded area behind the Blowdown Ponds (SWMU 10, see Photo A.25). The sample was collected from a depth of 0 to 3 inches (see Photo A.26). The soil appeared tan and silty, with no visible contamination (see Photo A.27).

Sample S09 is the equipment blank. It was collected by rinsing the scoop with distilled water and collecting the rinsate in one 80-ounce amber glass bottle for organics analysis, two

40-milliliter glass bottles for volatile organics analysis, and one 1-liter plastic bottle for metals analysis (see Photos A.28 and A.29).

Samples were packaged for shipment in insulated coolers with dry ice. After labeling, sample containers were further contained in plastic bags or metal paint cans (SAS samples) and cushioned with packing material to prevent breakage. Appropriate chain-of-custody forms and packing lists were included, and the coolers were sealed with custody seals. Samples were delivered to Spectrix by courier service for same-day delivery, and to Weyerhauser and SAIC via Federal Express for overnight delivery.

The field team left the facility at 6:00 p.m. C.D.T.

2.3 QC Procedures During Sampling

Prior to initiating any sampling, all sampling equipment was decontaminated according to the procedures specified in Section 2.1. Prior to each sample collection event, the equipment to be used was rinsed with distilled water.

A background soil sample was collected in an undisturbed area of the facility, away from the production area. The background sample was submitted for analysis with the environmental samples. A duplicate soil sample was not submitted due to the limited number of samples reserved for this SV. The sample volumes submitted for analysis adequately provided for all necessary laboratory-prepared duplicate analyses and matrix-spike analyses.

The procedures and methods employed by the field team were observed during each sampling event by the designated QC Officer, Marvin Unger of K. W. Brown and Associates.

3.0 ANALYTICAL RESULTS SUMMARY

This section presents a summary of the analytical data received for the samples submitted under case numbers 3195F and 7777. The laboratory analyses were performed by Contract Laboratories designated by the EPA Sample Management Office under the protocols and procedures specified by the "User's Guide to the Contract Laboratory Program," Third Edition (EPA, December 1986), and according to the standard methods and QA/QC protocols detailed in SW-846, "Test Methods for Evaluating Solid Waste," Third Edition (EPA, November 1986). Exhibits 3.1 through 3.9 summarize the findings of the CLP laboratory analyses. Six SWMUs were sampled.

EXHIBIT 3.1

FACILITY:	Denka Refinery	SAMPLE NO:	S01
SAMPLE LOCATION:	Lake Hausenstein	LAB SAMPLE NO:	97115
SAMPLING DATE:	August 5, 1987		
TIME:	10:10 - 10:15	MATRIX:	Soil

Parameter	Analytical Results
INORGANICS:	mg/kg
Silver	---
Aluminum	23,500 *
Arsenic	4.5
Barium	146
Beryllium	---
Calcium	30,300
Cadmium	---
Cobalt	6.6
Chromium	85
Copper	40
Iron	17,000
Mercury	.27
Potassium	2,720
Magnesium	5,700
Manganese	353
Sodium	675
Nickel	43
Lead	23
Antimony	--- R
Selenium	---
Tin	19

mg/kg - Milligrams per kilogram (parts per million)
* - Indicates duplicate analysis is not within control limits
R - Indicates spike sample recovery is not within control limits
--- - Indicates the element was not detected above detection limit value

EXHIBIT 3.1
(continued)

FACILITY:	Denka Refinery	SAMPLE NO:	S01
SAMPLE LOCATION:	Lake Hausenstein	LAB SAMPLE NO:	97115
SAMPLING DATE:	August 5, 1987		
TIME:	10:10 - 10:15	MATRIX:	Soil

Parameter	Analytical Results
INORGANICS:	mg/kg
Thallium	---
Vanadium	34
Zinc	210 *

mg/kg - Milligrams per kilogram (parts per million)
* - Indicates duplicate analysis is not within control limits
--- - Indicates the element was not detected above detection limit value

EXHIBIT 3.1
(continued)

FACILITY:	Denka Refinery	SAMPLE NO:	S01
SAMPLE LOCATION:	Lake Hausenstein	LAB SAMPLE NO:	87219001
SAMPLING DATE:	August 5, 1987		
TIME:	10:10 - 10:15	MATRIX:	Soil

Parameter	RT/Scan Number	Analytical Results
ORGANICS:		ug/kg
Methylene Chloride		23 JB
Toluene		6 J
Endrin **		250 J
Endosulfan II **		740
TENTATIVELY IDENTIFIED COMPOUNDS:		Estimated Values ug/kg
Thio-bis methane	83	180
Cyclotrisiloxane, Hexamethyl	1058	77 B
BI-2-Cyclohexen-lyl	670	14,000
Alkane	1300	16,000
Unknown	1317	5,800
Unknown	1333	40,000
Unknown	1345	15,000
Hydrocarbon	1356	93,000
Alkane	1507	26,000
Alkane	1570	42,000
Alkane	1618	48,000

ug/kg - Micrograms per kilogram (parts per billion)
J - Indicates compound is present, but below the listed detection limit
B - Indicates compound detected in QC blank
** - Indicates these compounds were not used as comparative parameters for suggested further actions because QC reported the data as only provisional.
Note: RT/Scan numbers only provided for tentatively identified compounds.

EXHIBIT 3.1
(continued)

FACILITY:	Denka Refinery	SAMPLE NO:	S01
SAMPLE LOCATION:	Lake Hausenstein	LAB SAMPLE NO:	87219001
SAMPLING DATE:	August 5, 1987		
TIME:	10:10 - 10:15	MATRIX:	Soil

Parameter	RT/Scan Number	Analytical Results
TENTATIVELY IDENTIFIED COMPOUNDS:		Estimated Values ug/kg
Alkane	1680	18,000
Alkane	1728	71,000
Alkane	1764	120,000
Alkane	1848	100,000
Unknown	1971	200,000
Hyrocarbon	2126	200,000
Hydrocarbon	2135	280,000
Unknown	2159	180,000
Unknown	2178	170,000

ug/kg - Micrograms per kilogram (parts per billion)
J - Indicates compound is present, but below the listed detection limit
B - Indicates compound detected in QC blank
** - Indicates these compounds were not used as comparative parameters for suggested further actions because QC reported the data as only provisional.
Note: RT/Scan numbers only provided for tentatively identified compounds.

EXHIBIT 3.2

FACILITY:	Denka Refinery	SAMPLE NO:	S02
SAMPLE LOCATION:	Lake Hausenstein	LAB SAMPLE NO:	97116
SAMPLING DATE:	August 5, 1987		
TIME:	10:30 - 10:50	MATRIX:	Soil

Parameter	Analytical Results
INORGANICS:	mg/kg
Silver	3.3
Aluminum	14,000 *
Arsenic	5.5
Barium	154
Beryllium	---
Calcium	9,040
Cadmium	---
Cobalt	5.0
Chromium	435
Copper	293
Iron	11,900
Mercury	.75
Potassium	1,380
Magnesium	2,460
Manganese	86
Sodium	746
Nickel	83
Lead	41
Antimony	--- R
Selenium	---
Tin	32

mg/kg - Milligrams per kilogram (parts per million)
* - Indicates duplicate analysis is not within control limits
R - Indicates spike sample recovery is not within control limits
--- - Indicates the element was not detected above detection limit value

EXHIBIT 3.2
(continued)

FACILITY:	Denka Refinery	SAMPLE NO:	S02
SAMPLE LOCATION:	Lake Hausenstein	LAB SAMPLE NO:	97116
SAMPLING DATE:	August 5, 1987		
TIME:	10:30 - 10:50	MATRIX:	Soil

Parameter	Analytical Results
INORGANICS:	mg/kg
Thallium	---
Vanadium	44
Zinc	387 *

mg/kg - Milligrams per kilogram (parts per million)
* - Indicates duplicate analysis is not within control limits
--- - Indicates the element was not detected above detection limit value

EXHIBIT 3.2
(continued)

FACILITY:	Denka Refinery	SAMPLE NO:	S02
SAMPLE LOCATION:	Lake Hausenstein	LAB SAMPLE NO:	87219002
SAMPLING DATE:	August 5, 1987		
TIME:	10:30 - 10:50	MATRIX:	Soil

Parameter	RT/Scan Number	Analytical Results
ORGANICS:		ug/kg
Methylene Chloride		24 JB
Heptachlor		150
Endrin **		300
Endosulfan II **		990
TENTATIVELY IDENTIFIED COMPOUNDS:		Estimated Values ug/kg
BI-2-Cyclohexen-lyl	670	14,000
1,5-Cyclo Octadiene, 1,6-Dichloro	957	37,000
Dodecane, 4,6-Dimethyl	1226	39,000
Unknown	1333	73,000
Unknown	1345	28,000
Hydrocarbon	1569	130,800
Hydrocarbon	1617	110,000
Hydrocarbon	1731	260,000
Hydrocarbon	1753	250,000

ug/kg - Micrograms per kilogram (parts per billion)
J - Indicates compound is present, but below the listed detection limit
B - Indicates compound detected in QC Blank
** - Indicates these compounds were not used as comparative parameters for suggested further actions because QC reported data as only provisional.
Note: RT/Scan numbers are only provided for tentatively identified compounds.

EXHIBIT 3.2
(continued)

FACILITY:	Denka Refinery	SAMPLE NO:	S02
SAMPLE LOCATION:	Lake Hausenstein	LAB SAMPLE NO:	87219002
SAMPLING DATE:	August 5, 1987		
TIME:	10:30 - 10:50	MATRIX:	Soil

Parameter	RT/Scan Number	Analytical Results
		Estimated Values ug/kg
TENTATIVELY IDENTIFIED COMPOUNDS: (continued)		
Unknown	1846	170,000
Hydrocarbon	1992	180,000
Hydrocarbon	2023	200,000
Hydrocarbon	2076	130,000
Hydrocarbon	2092	130,000
Hydrocarbon	2107	110,000
Hyrocarbon	2115	150,000
Hydrocarbon	2226	140,000
Hydrocarbon	2255	93,000

ug/kg - Micrograms per kilogram (parts per billion)
J - Indicates compound is present, but below the listed detection limit
B - Indicates compound detected in QC Blank
** - Indicates these compounds were not used as comparative parameters for suggested further actions because QC reported data as only provisional.
Note: RT/Scan numbers are only provided for tentatively identified compounds.

EXHIBIT 3.3

FACILITY:	Denka Refinery	SAMPLE NO:	S03
SAMPLE LOCATION:	Maleic Pond	LAB SAMPLE NO:	97117
SAMPLING DATE:	August 5, 1987		
TIME:	11:00 - 11:38	MATRIX:	Soil

Parameter	Analytical Results
INORGANICS:	mg/kg
Silver	---
Aluminum	25,000 *
Arsenic	6.1
Barium	67
Beryllium	---
Calcium	4,670
Cadmium	---
Cobalt	4.9
Chromium	49
Copper	20
Iron	20,000
Mercury	4.2
Potassium	2,820
Magnesium	4,020
Manganese	80
Sodium	191
Nickel	16
Lead	12
Antimony	--- R
Selenium	---
Tin	15

mg/kg - Milligrams per kilogram (parts per million)
* - Indicates duplicate analysis is not within control limits
R - Indicates spike sample recovery is not within control limits
--- - Indicates the element was not detected above detection limit value

EXHIBIT 3.3
(continued)

FACILITY:	Denka Refinery	SAMPLE NO:	S03
SAMPLE LOCATION:	Maleic Pond	LAB SAMPLE NO:	97117
SAMPLING DATE:	August 5, 1987		
TIME:	11:00 - 11:38	MATRIX:	Soil

Parameter	Analytical Results
INORGANICS: (continued)	mg/kg
Thallium	---
Vanadium	32
Zinc	52 *

mg/kg - Milligrams per kilogram (parts per million)
* - Indicates duplicate analysis is not within control limits
--- - Indicates the element was not detected above detection limit value

EXHIBIT 3.3
(continued)

FACILITY:	Denka Refinery	SAMPLE NO:	S03
SAMPLE LOCATION:	Maleic Pond #2	LAB SAMPLE NO:	87219003
SAMPLING DATE:	August 5, 1987		
TIME:	11:00 - 11:38	MATRIX:	Soil

Parameter	RT/Scan Number	Analytical Results
ORGANICS:		ug/kg
Methylene Chloride		650 JB
Toluene		260 J
Ethylbenzene		10,000
Total Xylenes		14,000 B
Endosulfan II **		160
TENTATIVELY IDENTIFIED COMPOUNDS:		Estimated Values ug/kg
BI-2-Cyclohexen-lyl	670	5,000
1,5-Cyclo Octadiene, 1,6-Dichloro	957	35,000
Hydrocarbon	1106	8,800
Octane, 2,4,6-Trimethyl-4-	1146	12,000
Naphthalene, 1,2,3-Trimethyl-4-	1184	34,000
Octane, 2,4,6-Trimethyl	1223	32,000
Hydrocarbon	1226	100,000
Napthalene, 1,2,3-Trimethyl-4 Propenyl (E)-	1224	130,000
Aromatic Hydrocarbon	1251	36,000
Aromatic Hydrocarbon	1272	29,000

ug/kg - Micrograms per kilogram (parts per billion)
J - Indicates compound is present, but below the listed detection limit
B - Indicates compound detected in QC Blank
** - Indicates these compounds were not used as comparative parameters for suggested further actions because QC reported data as only provisional.
Note: RT/Scan numbers are only provided for tentatively identified compounds.

EXHIBIT 3.3
(continued)

FACILITY:	Denka Refinery	SAMPLE NO:	S03
SAMPLE LOCATION:	Maleic Pond #2	LAB SAMPLE NO:	87219003
SAMPLING DATE:	August 5, 1987		
TIME:	11:00 - 11:38	MATRIX:	Soil

Parameter	RT/Scan Number	Analytical Results
		Estimated Values ug/kg
TENTATIVELY IDENTIFIED COMPOUNDS: (continued)		
Alkane	1300	99,000
Aromatic Hydrocarbon	1313	35,000
Aromatic Hydrocarbon	1317	75,000
Aromatic Hydrocarbon	1334	380,000
Hydrocarbon	1356	120,000
Unknown	1366	50,000
Unknown	1408	22,000
Unknown	1419	23,000
Unknown	1450	42,000
Aromatic Hydrocarbon	1467	21,000
Hydrocarbon	1541	38,000
Hydrocarbon	1606	46,000
Unknown	1618	110,000
Hydrocarbon	1688	93,000
Hydrocarbon	1728	310,000
Hydrocarbon	1754	150,000
Hydrocarbon	1883	61,000

ug/kg - Micrograms per kilogram (parts per billion)
J - Indicates compound is present, but below the listed detection limit
B - Indicates compound detected in QC Blank
** - Indicates these compounds were not used as comparative parameters for suggested further actions because QC reported data as only provisional.
Note: RT/Scan numbers are only provided for tentatively identified compounds.

EXHIBIT 3.4

FACILITY:	Denka Refinery	SAMPLE NO:	S04
SAMPLE LOCATION:	Imhoff Pond	LAB SAMPLE NO:	97118
SAMPLING DATE:	August 5, 1987		
TIME:	12:00 - 12:30	MATRIX:	Soil

Parameter	Analytical Results
INORGANICS:	mg/kg
Silver	---
Aluminum	10,800 *
Arsenic	7.5
Barium	125
Beryllium	---
Calcium	10,700
Cadmium	3.5
Cobalt	44
Chromium	273
Copper	697
Iron	19,200
Mercury	.26
Potassium	1,290
Magnesium	2,080
Manganese	178
Sodium	345
Nickel	50
Lead	51
Antimony	--- R
Selenium	---

mg/kg - Milligrams per kilogram (parts per million)
* - Indicates duplicate analysis is not within control limits
R - Indicates spike sample recovery is not within control limits
--- - Indicates the element was not detected above detection limit value

EXHIBIT 3.4
(continued)

FACILITY:	Denka Refinery	SAMPLE NO:	S04
SAMPLE LOCATION:	Imhoff Pond	LAB SAMPLE NO:	97118
SAMPLING DATE:	August 5, 1987		
TIME:	12:00 - 12:30	MATRIX:	Soil

Parameter	Analytical Results
INORGANICS: (continued)	mg/kg
Tin	31
Thallium	---
Vanadium	16,000
Zinc	464 *

mg/kg - Milligrams per kilogram (parts per million)
* - Indicates duplicate analysis is not within control limits
--- - Indicates the element was not detected above detection limit value

EXHIBIT 3.4
(continued)

FACILITY:	Denka Refinery	SAMPLE NO:	S04
SAMPLE LOCATION:	Imhoff Pond	LAB SAMPLE NO:	87219004
SAMPLING DATE:	August 5, 1987		
TIME:	12:00 - 12:30	MATRIX:	Soil

Parameter	RT/Scan Number	Analytical Results
ORGANICS:		ug/kg
Methylene Chloride		15 JB
Toluene		21 J
Ethylbenzene		150
Total Xylenes		320
Diethylphthalate		27,000
TENTATIVELY IDENTIFIED COMPOUNDS:		Estimated Values ug/kg
2-Methyl-2-Propanol	400	57
Alkane	897	31,000
Alkane	966	44,000
Alkane	986	84,000
IH Indene, Octahydro 2,2,4,4,7,7- Hexamethyl-Trans	1029	41,000
Alkane	1039	74,000
Alkane	1069	85,000
1,2-Benzenediol, 4-(1,1-Dimethylethyl)	1081	42,000

ug/kg - Micrograms per kilogram (parts per billion)
J - Indicates compound is present, but below the listed detection limit
B - Indicates compound detected in QC Blank
Note: RT/Scan numbers are only provided for tentatively identified compounds.

EXHIBIT 3.4
(continued)

FACILITY:	Denka Refinery	SAMPLE NO:	S04
SAMPLE LOCATION:	Imhoff Pond	LAB SAMPLE NO:	87219004
SAMPLING DATE:	August 5, 1987		
TIME:	12:00 - 12:30	MATRIX:	Soil

Parameter	RT/Scan Number	Analytical Results
		Estimated Values ug/kg
TENTATIVELY IDENTIFIED COMPOUNDS: (continued)		
Unknown	1113	77,000
Unknown	1119	65,000
Alkane	1147	200,000
Alkane	1185	200,000
Unknown	1191	44,000
Unknown	1227	36,000
Alkane	1254	68,000
Alkane	1301	260,000
Alkane	1425	190,000
Hydrocarbon	1666	63,000
Alkane	1360	200,000
Alkane	1425	190,000
Alkane	1487	150,000
Alkane	1547	61,000
Unknown	1608	44,000

ug/kg - Micrograms per kilogram (parts per billion)
J - Indicates compound is present, but below the listed detection limit
B - Indicates compound detected in QC Blank
Note: RT/Scan numbers are only provided for tentatively identified compounds.

EXHIBIT 3.5

FACILITY:	Denka Refinery	SAMPLE NO:	S05
SAMPLE LOCATION:	Empty Drum Area	LAB SAMPLE NO:	97119
SAMPLING DATE:	August 5, 1987		
TIME:	14:30 - 14:55	MATRIX:	Soil

Parameter	Analytical Results
INORGANICS:	mg/kg
Silver	---
Aluminum	6.350 *
Arsenic	11.2
Barium	121
Beryllium	---
Calcium	140,000
Cadmium	1.9
Cobalt	3.8
Chromium	45
Copper	140
Iron	11,000
Mercury	.13
Potassium	1,200
Magnesium	13,400
Manganese	244
Sodium	820
Nickel	29
Lead	96
Antimony	--- R
Selenium	---
Tin	17
Thallium	---
Vanadium	30
Zinc	508 *

mg/kg - Milligrams per kilogram (parts per million)
* - Indicates duplicate analysis is not within control limits
R - Indicates spike sample recovery is not within control limits
--- - Indicates the element was not detected above detection limit value

EXHIBIT 3.5
(continued)

FACILITY:	Denka Refinery	SAMPLE NO:	S05
SAMPLE LOCATION:	Empty Drum Area	LAB SAMPLE NO:	87219005
SAMPLING DATE:	August 5, 1987		
TIME:	14:30 - 14:55	MATRIX:	Soil

Parameter	RT/Scan Number	Analytical Results
ORGANICS:		ug/kg
Methylene Chloride		30 B
Toluene		11 J
Total Xylenes		8 J
TENTATIVELY IDENTIFIED COMPOUNDS:		Estimated Values ug/kg
Unknown	523	31,000
Unknown	573	13,000
Unknown	887	25,000
Unknown	976	28,000
Unknown	1028	4,600
Unknown	1073	24,000
Unknown	1083	230,000
Unknown	1914	4,600
Unknown	1970	6,300
Unknown	2004	6,600
Unknown	2130	250,000
Unknown	2136	130,000
Unknown	1678	14,000
Unknown	1694	28,000
Unknown	1839	26,000

ug/kg - Micrograms per kilogram (parts per billion)
J - Indicates compound is present, but below the listed detection limit
B - Indicates compound detected in QC Blank
Note: RT/Scan numbers are only provided for tentatively identified compounds.

EXHIBIT 3.6

FACILITY:	Denka Refinery	SAMPLE NO:	S06
SAMPLE LOCATION:	Waste Pile/ Neoprene Area	LAB SAMPLE NO:	870802008A
SAMPLING DATE:	August 5, 1987		
TIME:	15:00 - 15:25	MATRIX:	Soil

Parameter	Analytical Results
INORGANICS:	mg/kg
Silver	---
Aluminum	9,370
Arsenic	---
Barium	43.1
Beryllium	---
Calcium	105,000 *
Cadmium	---
Cobalt	---
Chromium	199
Copper	84.9
Iron	8,370 *
Mercury	.39 R
Potassium	837
Magnesium	6,760
Manganese	86.9
Sodium	24,200
Nickel	669
Lead	74.6 S
Antimony	--- R
Selenium	---
Tin	---

mg/kg - Milligrams per kilogram (parts per million)
* - Indicates duplicate analysis is not within control limits
R - Indicates spike sample recovery is not within control limits
--- - Indicates the element was not detected above detection limit value
S - Indicates value determined by method of standard addition.

EXHIBIT 3.6
(continued)

FACILITY:	Denka Refinery	SAMPLE NO:	S06
SAMPLE LOCATION:	Waste Pile/ Neoprene Area	LAB SAMPLE NO:	870802008A
SAMPLING DATE:	August 5, 1987		
TIME:	15:00 - 15:25	MATRIX:	Soil

Parameter	Analytical Results
INORGANICS: (continued)	mg/kg
Thallium	---
Vanadium	22.5
Zinc	483

mg/kg - Milligrams per kilogram (parts per million)
--- - Indicates the element was not detected above detection limit value

EXHIBIT 3.6
(continued)

FACILITY:	Denka Refinery	SAMPLE NO:	S06
SAMPLE LOCATION:	Waste Pile/ Neoprene Area	LAB SAMPLE NO:	870801804
SAMPLING DATE:	August 5, 1987		
TIME:	15:00 - 15:25	MATRIX:	Soil

Parameter	RT/Scan Number	Analytical Results
ORGANICS:		ug/kg
Methylene Chloride		96
Acetone		380 B
Carbon Disulfide		12 J
Benzene		5 J
2-Hexanone		5 J
bis (2 Ethyhexyl) Phthalate		39,000
TENTATIVELY IDENTIFIED COMPOUNDS:		Estimated Values ug/kg
Isocyanomethane	62	19 B
2-Propanol	123	28
2-Chloro 1,3-Butadiene	239	23
Unknown	563	18
1,6-Dichloro-1,5-Cyclooctadiene	918	41,000
Cyclododecane	1088	48,000
Unknown	1434	54,000
Unknown	1445	82,000
Phenothiazine (ACN)	1464	46,000

ug/kg - Micrograms per kilogram (parts per billion)
J - Indicates compound is present, but below the listed detection limit
B - Indicates compound detected in QC Blank
Note: RT/Scan numbers are only provided for tentatively identified compounds.

EXHIBIT 3.6
(continued)

FACILITY:	Denka Refinery	SAMPLE NO:	S06
SAMPLE LOCATION:	Waste Pile/ Neoprene Area	LAB SAMPLE NO:	870801804
SAMPLING DATE:	August 5, 1987		
TIME:	15:00 - 15:25	MATRIX:	Soil

Parameter	RT/Scan Number	Analytical Results
		Estimated Values ug/kg
TENTATIVELY IDENTIFIED COMPOUNDS: (continued)		
Unknown	1517	120,000
Unknown	1550	140,000
Unknown	1596	69,000
1-Phenanthrenecarboxylic Acid 1,2,3,4,4A	1643	57,000
Unknown	1671	50,000
Hexadecane	1727	61,000
Unknown	1811	62,000
Unknown	1850	57,000
Unknown	1897	140,000
Unknown	1911	110,000
Unknown	1952	1,300,000
Unknown	2012	120,000
Unknown	2041	110,000
Unknown	2067	59,000
Unknown	2275	150,000

ug/kg - Micrograms per kilogram (parts per billion)
J - Indicates compound is present, but below the listed detection limit
B - Indicates compound detected in QC Blank
Note: RT/Scan numbers are only provided for tentatively identified compounds.

EXHIBIT 3.7

FACILITY:	Denka Refinery	SAMPLE NO:	S07
SAMPLE LOCATION:	Landfill Area Near Cooling Tower	LAB SAMPLE NO:	870802009A
SAMPLING DATE:	August 5, 1987		
TIME:	15:45 - 16:00	MATRIX:	Soil

Parameter	Analytical Results
INORGANICS:	mg/kg
Silver	---
Aluminum	10,700 *
Arsenic	8.60
Barium	107
Beryllium	---
Calcium	30,100 *
Cadmium	---
Cobalt	---
Chromium	151
Copper	20.6
Iron	9,710 *
Mercury	.49 R
Potassium	1,150
Magnesium	2,650
Manganese	133
Sodium	3,110
Nickel	67.6
Lead	66.4 S
Antimony	--- R
Selenium	3.55
Tin	---

mg/kg - Milligrams per kilogram (parts per million)
* - Indicates duplicate analysis is not within control limits
R - Indiates spike sample recovery is not within control limits
--- - Indicates the element was not detected above detection limit value
S - Indicates values determined by method of standard addition.

EXHIBIT 3.7
(continued)

FACILITY:	Denka Refinery	SAMPLE NO:	S07
SAMPLE LOCATION:	Landfill Area Near Cooling Tower	LAB SAMPLE NO:	870802009A
SAMPLING DATE:	August 5, 1987		
TIME:	15:45 - 16:00	MATRIX:	Soil

Parameter	Analytical Results
INORGANICS:	mg/kg
Thallium	---
Vanadium	21.8
Zinc	211 *

mg/kg - Milligrams per kilogram (parts per million)
* - Indicates duplicate analysis is not within control limits
--- - Indicates the element was not detected above detection limit value

EXHIBIT 3.7
(continued)

FACILITY:	Denka Refinery	SAMPLE NO:	S07
SAMPLE LOCATION:	Landfill Area Near Cooling Tower	LAB SAMPLE NO:	870801805
SAMPLING DATE:	August 5, 1987		
TIME:	15:45 - 16:00	MATRIX:	Soil

Parameter	RT/Scan Number	Analytical Results
ORGANICS:		ug/kg
Vinylchloride		6 J
Methylene Chloride		15
Acetone		150 B
2-Butanone		10 J
2-Hexanone		8 J
4-Methylphenol		730 J
bis (2 Ethylhexyl) Phthalate		3,100 J
TENTATIVELY IDENTIFIED COMPOUNDS:		Estimated Values ug/kg
Tetra hydrofuran	142	3 B
Unknown	593	12
Unknown	246	70,000
1-Ethenyl-3-methylene cyclopentene	274	2,600
1-Chloro-2-Ethyl Benzene	593	5,700
Unknown	819	490,000
1-Chloro-4-(1-Chloroethenyl) Cyclohexene	836	7,700
Unknown	870	2,200
Unknown	877	2,500

ug/kg - Micrograms per kilogram (parts per billion)
J - Indicates compound is present, but below the listed detection limit
B - Indicates compound detected in QC Blank
Note: RT/Scan numbers are only provided for tentatively identified compounds.

EXHIBIT 3.7
(continued)

FACILITY:	Denka Refinery	SAMPLE NO:	S07
SAMPLE LOCATION:	Landfill Area Near Cooling Tower	LAB SAMPLE NO:	870801805
SAMPLING DATE:	August 5, 1987		
TIME:	15:45 - 16:00	MATRIX:	Soil

Parameter	RT/Scan Number	Analytical Results
		Estimated Values ug/kg
TENTATIVELY IDENTIFIED COMPOUNDS: (continued)		
1,6 Dichloro-1,5-Cyclooctadiene	932	340,000
2,5-Cyclohexadiene-1,4-Dione,2,6-bis(1,1)	1033	9,400
Unknown	1106	2,400
Unknown	1272	15,000
Unknown	1370	11,000
Unknown	1378	16,000
Unknown	1416	15,000
Unknown	1427	11,000
Unknown	1467	24,000
Unknown	1502	13,000
Unknown	1522	19,000
Unknown	1549	17,000
Unknown	1956	15,000
Unknown	1962	23,000
Unknown	1995	5,900
Unknown	2006	7,200
Unknown	2015	16,000
Unknown	2043	6,000

ug/kg - Micrograms per kilogram (parts per billion)
J - Indicates compound is present, but below the listed detection limit
B - Indicates compound detected in QC Blank
Note: RT/Scan numbers are only provided for tentatively identified compounds.

EXHIBIT 3.8

FACILITY:	Denka Refinery	SAMPLE NO:	S08
SAMPLE LOCATION:	Background Location	LAB SAMPLE NO:	870802005A
SAMPLING DATE:	August 5, 1987		
TIME:	16:00 - 16:35	MATRIX:	Soil

Parameter	Analytical Results
INORGANICS:	mg/kg
Silver	--- *
Aluminum	8,390 *
Arsenic	---
Barium	63.6
Beryllium	---
Calcium	3,700 *
Cadmium	---
Cobalt	---
Chromium	13.2
Copper	---
Iron	6,660 *
Mercury	---
Potassium	610
Magnesium	695
Manganese	551
Sodium	---
Nickel	---
Lead	27.6 S
Antimony	--- R
Selenium	---
Tin	---

mg/kg - Milligrams per kilogram (parts per million)
* - Indicates duplicate analysis is not within control limits
R - Indicates spike sample recovery is not within control limits
--- - Indicates the element was not detected above detection limit value
S - Indicates value determined by methods of standard addition.

EXHIBIT 3.8
(continued)

FACILITY:	Denka Refinery	SAMPLE NO:	S08
SAMPLE LOCATION:	Background Location	LAB SAMPLE NO:	870802005A
SAMPLING DATE:	August 5, 1987		
TIME:	16:00 - 16:35	MATRIX:	Soil

Parameter	Analytical Results
INORGANICS: (continued)	mg/kg
Thallium	---
Vanadium	18.0
Zinc	46.7 *

mg/kg - Milligrams per kilogram (parts per million)
* - Indicates duplicate analysis is not within control limits
--- - Indicates the element was not detected above detection limit value

EXHIBIT 3.8
(continued)

FACILITY:	Denka Refinery	SAMPLE NO:	S08
SAMPLE LOCATION:	Background Location	LAB SAMPLE NO:	870801806
SAMPLING DATE:	August 5, 1987		
TIME:	16:00 - 16:35	MATRIX:	Soil

Parameter	RT/Scan Number	Analytical Results
ORGANICS:		ug/kg
Acetone		9 J
TENTATIVELY IDENTIFIED COMPOUNDS:		Estimated Values ug/kg
Isocyanomethane	987	4
Comphene	831	5
1-Chloro-5-(1-Chloroethenyl) Cyclohexane	816	42
Unknown	210	960 B
1-Methylethyl Ester Acetic Acid	218	1,400 B
2,4-Dimethyl-2-Pentanol	264	44,000 B
5-Methyl-2-Hexanone	275	550 B
2,3,4-Trimethylhexane	281	31- B
2,3,6-Trimethylheptane	295	500 B
Unknown	383	740 B
5-Methyl-5-Hexen-2-one	443	260
Unknown	1069	2,200
(E)-9-Eicosene	1849	340
Unknown	1949	240

ug/kg - Micrograms per kilogram (parts per billion)
J - Indicates compound is present, but below the listed detection limit
B - Indicates compound detected in QC Blank
Note: RT/Scan numbers are only provided for tentatively identified compounds.

EXHIBIT 3.8
(continued)

FACILITY:	Denka Refinery	SAMPLE NO:	S08
SAMPLE LOCATION:	Background Location	LAB SAMPLE NO:	870801806
SAMPLING DATE:	August 5, 1987		
TIME:	16:00 - 16:35	MATRIX:	Soil

Parameter	RT/Scan Number	Analytical Results
		Estimated Values ug/kg
TENTATIVELY IDENTIFIED COMPOUNDS: (continued)		
Tricarbonyl[N(Phenyl-2-Pyridinylme)] Iron	2025	1,300
Unknown	2036	170
Unknown	2045	250
Tricarbonyl[N(Phenyl-2-Pyridinylme)] Iron	2133	350
Unknown	2176	330
Unknown	2238	270
Unknown	2259	240
Unknown	2332	1,100

ug/kg - Micrograms per kilogram (parts per billion)
J - Indicates compound is present, but below the listed detection limit
B - Indicates compound detected in QC Blank
Note: RT/Scan numbers are only provided for tentatively identified compounds.

EXHIBIT 3.9

FACILITY:	Denka Refinery	SAMPLE NO:	S09
SAMPLE LOCATION:	Equipment Blank	LAB SAMPLE NO:	870801809
SAMPLING DATE:	August 5, 1987		
TIME:	16:55 - 17:10	MATRIX:	Water

Parameter	RT/Scan Number	Analytical Results
ORGANICS:		ug/kg
Methylene Chloride		3 J
bis-(2-Ethylhexyl) Phthalate		35
TENTATIVELY IDENTIFIED COMPOUNDS:		Estimated Values ug/kg
Isocyanomethane	57	9 B
2-Methyl-Cyclopentanol	266	30 B
Dihydro-3,5-Dimethyl-2 (3H) Furanone	480	7
3,5-Dimethylphenol	734	11
Unknown	830	7
Unknown	889	11
BIS (4 Methy) 1,2-Benzenedicarboxylic Acid	1611	10
BIS (4 Methy) 1,2-Benzenedicarboxylic Acid	1626	7
Unknown	1644	7

ug/kg - Micrograms per kilogram (parts per billion)
J - Indicates compound is present, but below the listed detection limit
B - Indicates compound detected in QC Blank
Note: RT/Scan numbers are only provided for tentatively identified compounds.

EXHIBIT 3.9
(continued)

FACILITY:	Denka Refinery	SAMPLE NO:	S09
SAMPLE LOCATION:	Equipment Blank	LAB SAMPLE NO:	870802002A
SAMPLING DATE:	August 5, 1987		
TIME:	16:55 - 17:10	MATRIX:	Water

Parameter	Analytical Results
INORGANICS:	ug/l
Silver	---
Aluminum	---
Arsenic	---
Barium	---
Beryllium	---
Calcium	---
Cadmium	---
Cobalt	---
Chromium	---
Copper	28
Iron	---
Mercury	---
Potassium	---
Magnesium	---
Manganese	---
Sodium	---
Nickel	---
Lead	69.0
Antimony	---
Selenium	---
Tin	---
Thallium	---
Vanadium	---
Zinc	---

ug/l - Micrograms/liter (parts per billion)
--- - Indicates the element was not detected above detection limit value

4.0 FINAL CONCLUSIONS AND SUGGESTIONS

This section presents conclusions and suggestions for further action for the SWMUs and other areas of concern at the Denka Chemical Corporation facility in Houston, Texas.

4.1 SWMU-Specific Suggestions

Each SWMU previously identified in the PR/VSI report is discussed below. Suggestions for the units which were sampled have been revised to reflect the sampling results. The sample number is given only for the units which were included in the sampling effort. A summary of analytical results is presented in Section 3.0.

4.1.1 SWMU 1 - Maleic Pond - Upper Section

Suggested Further Action: RCRA Facility Investigation (RFI)

Reasons: This unit managed hazardous wastes/constituents, and was closed with USEPA approval as a disposal unit. Previous groundwater monitoring results have shown contamination in wells downgradient of the unit. The area was capped, graded, and seeded at closure. No visible migration of hazardous wastes/constituents was identified during the VSI.

4.1.2 SWMU 2 - Process Waste Storage Area

Sample Number: S07

Suggested Further Action: RFI

Reasons: The presence of organic and inorganic constituents was confirmed in samples collected in areas where visible signs of contamination were evident in the Process Waste Storage Area. These include six tentatively identified organic compounds: tetra hydrofuran; 1-ethenyl-3-methylene cyclopentene; 1-chloro-2 ethyl benzene; 1-chloro-4-(1-chloroethenyl) cyclohexene; 1,6- dichloro-1,5-cyclo-octadiene; 2,5-cyclo- hexadiene-1,4- dione,2,6-bis(1,1), as well as several unknowns which were detected but not identified. In addition, several inorganics, such as arsenic, chromium, manganese, nickel, and selenium, were detected.

4.1.3 SWMU 3 - Waste Pile

Sample Number: S06

Suggested Further Action: RFI

Reasons: The presence of organic and inorganic constituents was confirmed in samples collected where obvious contamination was present in the soil. These include several tentatively identified organic compounds such as 2-propanol; 2-chloro-1,3-butadiene; 1,6-dichloro-1,5-cyclo-octadiene; cyclododecane;

phenothiazine (ACN); 1-phenanthrenecarboxylic acid 1,2,3,4,4A; and Hexadecane, as well as several unknowns which were detected, but not identified. In addition, several inorganics, such as chromium, manganese, nickel, and zinc, were detected.

4.1.4 SWMU 4 - Imhoff Pond

Sample Number: S04

Suggested Further Action: RFI

Reasons: A sample was collected in the area adjacent to the Imhoff pond where the Heat Exchanger Bundle Cleaning rinsate drains. The presence of organic and inorganic constituents was confirmed in samples collected where obvious contamination was present in the soil. These include organics such as ethylbenzene, xylenes, and several tentatively identified compounds (e.g., alkanes, hydrocarbons), as well as several unknowns which were detected but not identified. In addition, several inorganics, such as arsenic, cadmium, cobalt, chromium, iron, mercury, manganese, nickel, and vanadium, were detected.

4.1.5 SWMU 5 - Maleic Pond

Sample Number: S03

Suggested Further Action: RFI

Reasons: The presence of organics and inorganic constituents was confirmed in samples collected in areas where obvious contamination was present in the soil. These include organics such as ethylbenzene and several tentatively identified compounds such as BI-2-cyclohexen-lyl; 1,5-cyclo-octadiene, 1,6-dichloro; octane 2,4,6-trimethyl-4; naphthalene; 1,2,3-trimethyl-4; hydrocarbons; and aromatic hydrocarbons. Several unknowns were detected but not identified. In addition, several inorganics such as arsenic, cobalt, chromium, iron, mercury, manganese, nickel, tin, and vanadium were detected.

4.1.6 SWMU 6 - Lake Hausenstein

Sample Numbers: S01 and S02

Suggested Further Action: RFI

Reasons: The presence of organic and inorganic constituents was confirmed in samples collected where obvious contamination was present in the soil. These include several tentatively identified organic compounds such as BI-2-cyclohexen-lyl, hydrocarbons, and several unknowns which were detected, but not identified. In addition, several inorganics, such as arsenic, cobalt, chromium, mercury, manganese, nickel, selenium, tin, and vanadium, were detected.

4.1.7 SWMU 7 - Solar Pond

Suggested Further Action: No further action at this time

Reasons: The unit has accepted non-hazardous, alum clarifier sludge in the past and, on at least one occasion, has overflowed its dike. There were no hazardous constituents involved, however.

4.1.8 SWMU 8 - Anaerobic Pond

Suggested Further Action: No further action at this time

Reasons: The inactive unit has accepted wastes in the past and, on at least one occasion, has overflowed its dike. The wastes reportedly did not contain any hazardous constituents.

4.1.9 SWMU 9 - Alum Clarifiers

Suggested Further Action: No further action at this time

Reasons: Due to unit design and the reported non-hazardous nature of the wastes managed, no release of hazardous waste or constituents is expected to have occurred or be continuing to occur at this unit.

4.1.10 SWMU 10 - Two Boiler Blowdown Ponds

Suggested Further Action: No further action at this time

Reasons: Due to unit design and the reported non-hazardous nature of the wastes managed, no release of hazardous wastes or constituents is expected to have occurred or be continuing to occur at this unit.

4.1.11 SWMU 11 - Three Aeration Ponds

Suggested Further Action: No further action at this time

Reasons: These ponds are active RCRA regulated units. The units were originally excavated in natural clay with the bottom in situ soils recompacted into an infiltration barrier. Waste water received in these units receive initial treatment at other units. Controls adequate to prevent the release of constituents appear to be employed at this unit.

4.1.12 SWMU 12 - Skimmer Pit

Suggested Further Action: No further action at this time

Reasons: The unit is used intermittently. Controls adequate to prevent the release of hazardous waste of constituents to the environment appear to be employed at this unit.

4.1.13 SWMU 13 - Two Latex Pits

Suggested Further Action: RFI

Reasons: Due to releases from overflow observed during the VSI and a relatively high water table at this unit, subsurface investigation during the RFI appears warranted.

4.1.14 SWMU 14 - Splitter Box

Suggested Further Action: RFI

Reasons: Due to unit design, there is a moderate potential for past and continuing release of hazardous constituents directly to adjacent water bodies, including Sim's Bayou. Restriction of all flow through unit to Lake Hausenstein may be warranted.

4.1.15 SWMU 15 - RCP Pit

Suggested Further Action: RFI

Reasons: Due to observed releases related to poor housekeeping practices, the unit has demonstrated a high potential for release of hazardous waste or constituents to the subsurface.

4.1.16 SWMU 16 - Latex Trench System

Suggested Further Action: RFI

Reasons: Releases related to poor housekeeping practices and an uncharacterized seepage from a nearby bin were observed during the VSI which may lead to possible downgradient contamination. The unit has demonstrated a high potential for release of hazardous waste or constituents to the subsurface.

4.1.17 SWMU 17 - Chemical Trench

Suggested Further Action: No further action at this time

Reasons: The unit is used intermittently. Controls adequate to prevent the release of hazardous waste or constituents to the environment appear to be employed at this unit.

4.1.18 SWMU 18 - Clean Storm Water Drainage Ditch

Suggested Further Action: RFI

Reasons: Due to the presence of wastes and oily stains in the unit (see Photograph No. 15 of the PR/VSI Report), soil and subsurface soils contamination is expected. The unit has no release controls.

4.1.19 SWMU 19 - Ditch Alongside Aeration Ponds

Suggested Further Action: RFI

Reasons: Due to the presence of wastes and oily stains in the unit (see Photograph No. 27 of the PR/VSI Report), soil and subsurface soils contamination is expected. The unit is an unlined earthen ditch.

4.1.20 SWMU 20 - Ditch Alongside Rail Line of Monomer Plant

Suggested Further Action: RFI

Reasons: Due to the presence of wastes and oily stains (see Photograph No. 13 of the PR/VSI Report), soil and subsurface soils contamination may warrant investigation. The unit is an unlined, earthen ditch.

4.1.21 SWMU 21 - Monomer Plant Sump

Suggested Further Action: No further action at this time

Reasons: The unit is used intermittently. Controls adequate to prevent the release of hazardous waste or constituents to the environment appear to be employed at this unit.

4.1.22 SWMU 22 - Solvent Storage Sump

Suggested Further Action: No further action at this time

Reasons: The unit is used intermittently. Controls adequate to prevent the release of hazardous waste or constituents to the environment appear to be employed at this unit.

4.1.23 SWMU 23 - Lift Station at Lake Hausenstein

Suggested Further Action: No further action at this time

Reasons: The unit is used intermittently. Controls adequate to prevent the release of hazardous waste or constituents to the environment appear to be employed at this unit.

4.1.24 SWMU 24 - Sump at Tank 402

Suggested Further Action: No further action at this time

Reasons: The unit is used intermittently. Controls adequate to prevent the release of hazardous waste or constituents to the environment appear to be employed at this unit.

4.1.25 SWMU 25 - Abandoned Sump at Tank 413

Suggested Further Action: No further action at this time

Reasons: Based on VSI observations, the unit has low potential for release to any media.

4.1.26 SWMU 26 - Drum/Tanks Bay

Suggested Further Action: No further action at this time

Reasons: No evidence of release was observed during the VSI. Adequate release controls are employed at present.

4.1.27 SWMU 27 - Caustic Unloading Area

Suggested Further Action: RFI

Reasons: Routine spillage reportedly has occurred in the Caustic Unloading Area in the past. The addition of drip pans decreases the continuing release potential to soils. However, past releases warrant further investigation to verify if hazardous constituents are present.

4.1.28 SWMU 28 - Tank Truck Unloading Pad

Suggested Further Action: No further action at this time

Reasons: Adequate release controls appear to be employed.

4.1.29 SWMU 29 - Processed Neoprene and Latex Material on Pallets

Suggested Further Action: RFI

Reasons: The same wastes are managed at this unit as at the Waste Pile (SWMU #3). The presence of organic and inorganic constituents was confirmed in samples collected from the Waste Pile (Sample No. S06) where obvious contamination was present. These include several tentatively identified organic compounds such as 2-propanol; 2-chloro- 1,3-butadiene; 1,6-dichloro-1,5-cyclo-octadiene; cyclo- dodecane; pheno-thiazine (ACN); 1-phenanthrenecarboxylic acid 1,2,3,4,4A; and Hexadecane, as well as several unknowns which were detected, but not identified. In addition, several inorganics, such as chromium, manganese, nickel, and zinc, were detected. Therefore, the wastes contained in this unit may be a source of contamination to the clean storm water system, causing discharge of constituents directly to Sim's Bayou.

4.1.30 SWMU 30 - Latex Pits Pad

Suggested Further Action: RFI

Reasons: The unit receives industrial solid waste from the finishing plant. The unit is unlined. During the VSI, it was noted that the unit had released materials outside the unit boundaries. Soil sampling is suggested to verify the presence of hazardous constituents.

4.1.31 SWMU 31 - HEB Cleaning Pad

Suggested Further Action: RFI

Reasons: Staining, indicating possible contamination was noted during the VSI within the area adjacent to the unit. Additionally, Sample No. S04, taken in the vicinity of where the HEB Cleaning Pad drains to the Imhoff Pond verified the presence of hazardous constituents.

4.1.32 SWMU 32 - Tank Car Loading Area

Suggested Further Action: RFI

Reasons: The tank car area was used in the past to wash out tank cars. There were no release controls employed to restrict the release of waste water wash. During the VSI, staining of the ground in and around the area was observed. Soil sampling is suggested to verify the presence of hazardous constituents.

4.1.33 SWMU 33 - Coke Storage Area Pad

Suggested Further Action: No further action at this time

Reasons: The unit appears to have adequate controls to prevent the release of hazardous waste or constituents to the environment.

4.1.34 SWMU 34 - Tanks 412 and 413

Suggested Further Action: RFI

Reasons: During the VSI, the unit was discharging waste that is believed to contain minimal quantities of hazardous constituents. Soil sampling is suggested to verify the presence of hazardous constituents.

4.1.35 SWMU 35 - Tank 415

Suggested Further Action: No further action at this time

Reasons: Adequate release controls appear to be employed.

4.1.36 SWMU 36 - Two Clarifiers

Suggested Further Action: No further action at this time

Reasons: Adequate release controls appear to be employed.

4.1.37 SWMU 37 - Asbestos Roll-off Bin

Suggested Further Action: No further action at this time

Reasons: Adequate release controls appear to be employed.

4.1.38 SWMU 38 - Empty Drum Storage Area

Sample Number: S05

Suggested Further Action: RFI

Reasons: The presence of organic and inorganic constituents was confirmed in the samples collected where obvious contamination was present in the soil. These constituents include many unknowns detected but not identified. In addition, several inorganics, such as arsenic, cadmium, cobalt, chromium, mercury, magnesium, manganese, nickel, selenium, tin, and vanadium, were detected.

4.1.39 SWMU 39 - QC Laboratory Waste Drum Storage Area

Suggested Further Action: RFI

Reasons: Leaking drums were observed to be draining to a clean storm water drain during the VSI. An RFI is suggested.

4.1.40 SWMU 40 - Spent Catalyst Storage Area at the Monomer Plant

Suggested Further Action: No further action at this time

Reasons: This unit is a staging and temporary storage area for containerized wastes. The wastes are stored on a concrete pavement. No releases were documented or observed at the time of the VSI.

4.1.41 SWMU 41 - Spent Catalyst Storage Area at the Maleic Warehouse

Suggested Further Action: No further action at this time

Reasons: This unit is a temporary staging area. There was no documented or visible evidence of release at the unit and release potentials to all media appeared to be low.

4.1.42 SWMU 42 - Rolloff Bin at Latex Trench

Suggested Further Action: RFI

Reasons: This roll-off bin is permanently located straddled across the Latex Trench System (SWMU No. 16). During the VSI, liquid was observed to be dripping from the roll-off box into the Latex Trench. Also, pungent odors were noted. Therefore, it is suggested that this unit be incorporated with the RFI for the Latex Trench (SWMU 16).

4.1.43 SWMU 43 - Incinerator

Suggested Further Action: No further action at this time

Reasons: Adequate release controls appear to be employed at this unit. No history of releases have been reported.

4.2 Areas of Concern

4.2.1 Area of Concern A - Outside Storage Area

Suggested Further Action: RFI

Reasons: The storage area was used to store products used in facility operations. During the VSI, it was noted that several drums were overturned. Oil stains on the ground were apparent. Soil sampling during the RFI is suggested to verify the presence of hazardous constituents and the extent of the contamination.

4.2.2 Area of Concern B - Battery Storage Area

Suggested Further Action: No further action

Reasons: The batteries, which are stored improperly, pose a high potential for release. Bare soil is located behind the storage area. It is suggested that the batteries be removed to an alternative storage area which should be properly constructed to control releases of battery acid.

4.2.3 Area of Concern C - Oil Spill on Building

Suggested Further Action: RFI

Reasons: During the VSI, spillage appeared to be saturating the ground surface. Clean up of this material is suggested to avoid subsurface contamination. The source of the spillage should be located and addressed. Soil sampling during the RFI is suggested to verify the presence of hazardous constituents.

4.2.4 Area of Concern D - Maleic Anhydride Stream Sampling Station

Suggested Further Action: RFI

Reasons: Spillage of maleic waste represents a potential release of hazardous constituents to the subsurface. Soil sampling during the RFI is suggested to verify the presence of hazardous constituents.

4.2.5 Area of Concern E - Diesel and Gasoline Tank Storage Area

Suggested Further Action: RFI

Reasons: Visible evidence of a release was noted during the VSI. Soil sampling during the RFI is suggested to verify the presence of hazardous constituents.

4.2.6 Area of Concern F - Dispensing Station for Solvents and Oils

Suggested Further Action: No further action is suggested at this time.

Reasons: In the past, there have been direct releases of hazardous constituents to the clean storm water system. Installation of a drip pan can easily prevent continuing releases.

4.2.7 Areas of Concern G - Two Recovered Chloroprene Tanks

Suggested Further Action: RFI

Reasons: Due to poor housekeeping practices, the paved diked containment dike should be checked for integrity to determine the potential for release to the subsurface. Soil sampling around the units is suggested to determine the presence of hazardous constituents.

4.3 Results of QC-Related Analyses

Sample S09 represents the equipment blank which was collected to represent the decontamination of the sampling equipment. The analyses of the equipment blanks found detectable levels of two inorganic constituents (copper and lead), as well as several tentatively identified organic compounds and bis (2-ethylhexyl) phthalate. These results are presented in Exhibit 3.9. These constituents probably originated from the distilled water used and its container, and are not considered as comparative parameters for further suggestions.

Sample S08 represents the background soil sample collected at the Denka facility (Exhibit 3-8). The sample was collected from an undisturbed, wooded area of the property. The analysis of this sample detected low levels of organic constituents such as isocyanomethane, comphene, 1-chloro-5(1-chloroethenyl) cyclohexane, and several unknown compounds. Inorganic constituents such as barium, chromium, potassium, manganese, magnesium, vanadium, zinc, and lead were also detected. Because these constituents were detected at low

levels, they are not expected to affect the results of the samples collected from other areas of the facility. These constituents are not considered as comparative parameters for further suggestions at other areas of the facility, unless the background levels were exceeded.

Appendix A
Photograph Log

Wastewaters collected from the Texas Petrochemicals plant, co-owner of the biological treatment facility (SWMU 11) include process wastewaters from the separation of 1,3-butadiene from mixed C4 hydrocarbon feedstocks, boiler and cooling tower blowdown, water treatment plant wastes, and contaminated runoff. These are pretreated and flow-equalized by Texas Petrochemicals and then sent to the jointly-owned biological treatment ponds (SWMU 11) for treatment (67).

2.3.2 Solid and Hazardous Waste

Denka identified eight potentially hazardous wastes in its RCRA Part A permit application which was filed on November 18, 1980. These wastes are corrosive (D003), ignitable (D001) and reactive (D002) wastes, and various listed chemicals which may be discarded including maleic anhydride (U147), acetone (U002), 1,4-dichloro-2-butene (U074), methanol (U154), and trichloroethane (U226).

The listed chemicals were included because of possible losses of raw material or product through spills; they were not expected to be generated on a regular basis. In addition, asbestos was listed as a waste material associated with maintenance and decommissioning of old insulation. Asbestos is not regulated as a hazardous waste under RCRA; it is considered a hazardous air pollutant and is regulated under 40 CFR Part 112 (64).

Two wastewater streams are identified as hazardous wastes due to the characteristic of corrosivity: the alkaline neoprene process wastewaters and the acidic maleic anhydride process

wastewaters. In both cases, the filing for interim status as a treatment, storage, and disposal (TSD) facility under RCRA was done purportedly as a "defensive" filing, based on knowledge of the processes, but limited actual data on waste characteristics. Data collected from November 1984 through October 1985 showed only one pH value below 2.0 for the maleic anhydride wastewater. The neoprene wastewater, on the other hand, consistently had pH levels above 12.5 before neutralization (12, 67).

In addition to the hazardous wastes identified in the RCRA Part A permit application, miscellaneous plant trash is generated at the plant (12, 67).

2.4 Identification of Solid Waste Management Units

Eighteen SWMUs located at the Denka facility were identified during the PR. Five of those SWMUs (seven impoundments as the areation ponds include three units) are RCRA-regulated. Closure plans have been submitted to the Texas Water Commission for all seven ponds (10).

A VSI was performed on July 20 and 21, 1987, to verify the information developed during the PR and identify any other SWMUs. Twenty-two additional SWMUs were identified during the VSI.

Table 1 reflects SWMUs identified during the PR and VSI and lists the regulatory and operational status of the 43 SWMUs.

TABLE 2-1
DENKA CHEMICAL CORPORATION
HOUSTON, TEXAS
SOLID WASTE MANAGEMENT UNITS

SWMU #		Unit	Status	RCRA-Regulated		Groundwater Monitoring
LAND DISPOSAL:						
1		Maleic Pond - Upper Section*	Closed	Yes	RFI	Yes
#7 2	SV	Process Waste Storage Areas	Closed	No	RFI	No
#6 3	SV	Waste Pile	Active	No	RFI	No
SURFACE IMPOUNDMENT:						
#4 4	SV	Imhoff Pond*	Active	Yes	RFI	Yes
#3 5	SV	Maleic Pond - Lower Section*	Active	Yes	RFI	Yes
#1 #2 6	SV	Lake Hausenstein (Storm Water Pond)*	Active	Yes	RFI	Yes
7		Solar Pond*	Inactive	No	NFA	No
8		Anaerobic Pond*	Inactive	No	NFA	No
9		Alum Clarifiers*	Active	No	NFA	No
10		Two Boiler Blowdown Ponds*	Inactive	No	NFA	No
11		Three Aeration Ponds*	Active	Yes	NFA	Yes
PITS, SUMPS AND TRENCHES:						
12		Skimmer Pit*	Active	No	NFA	No

*Indicates PR - identified

TABLE 2-1
DENKA CHEMICAL CORPORATION
HOUSTON, TEXAS
SOLID WASTE MANAGEMENT UNITS
(continued)

SWMU #	Unit	Status	RCRA-Regulated		Groundwater Monitoring
PITS, SUMPS AND TRENCHES: (continued)					
13	Two Latex Pits*	Active	No	RFI	No
14	Splitter Box*	Active	No	RFI	No
15	RCP Pit Wash-down Area	Active	No	RFI	No
16	Latex Trench System	Active	No	RFI	No
17	Chemical Trench*	Active	No	NFA	No
18	Clean Storm Water Ditch at Areas 3 and 5	Active	No	RFI	No
19	Ditch Alongside Aerator Ponds	Active	No	RFI	No
20	Ditch Alongside Rail Line at Monomer Plant	Active	No	RFI	No
21	Monomer Plant Sump	Active	No	NFA	No
22	Solvent Storage Area Sump	Active	No	NFA	No
23	Lift Station at Lake Hausenstein	Active	No	NFA	No

*Indicates PR - identified

TABLE 2-1
DENKA CHEMICAL CORPORATION
HOUSTON, TEXAS
SOLID WASTE MANAGEMENT UNITS
(continued)

SWMU #	Unit	Status	RCRA-Regulated		Groundwater Monitoring
OPEN STORAGE AREA:					
24	Unidentified Sump at Tank 402	Active	No	NFA	No
25	Abandoned Sump at Tank 413	Inactive	No	NFA	No
26	Drum/Tanks Bay	Active	No	NFA	No
27	Caustic Unloading Area*	Active	No	RFI	No
28	Tank Truck Unloading Area	Active	No	NFA	No
29	Processed Neoprene and Latex Wastes	Active	No	~~NFA~~ RFI	No
30	Latex Pits Pad	Active	No	RFI	No
31	HEB Cleaning Pad	Active	No	RFI	No
32	Tank Car Loading Area	Inactive	No	RFI	No
33	Coke Storage Pad	Active	No	NFA	No
TANKS:					
34	Tanks 412 and 413*	Active	No	RFI	No

*Indicates PR - identified

TABLE 2-1
DENKA CHEMICAL CORPORATION
HOUSTON, TEXAS
SOLID WASTE MANAGEMENT UNITS
(continued)

SWMU #	Unit	Status	RCRA-Regulated		Groundwater Monitoring
TANKS: (continued)					
35	Tank 415*	Active	No	NFA	No
36	Two Clarifiers	Active	No	NFA	No
CONTAINER STORAGE:					
37	Asbestos Roll-Off Bin	Active	No	NFA	No
#5 38 5√	Empty Drum Storage Area*	Active	No	RFI	No
39	QC Lab Waste Drum Storage Area	Active	No	RFI	No
40	Spent Catalyst Storage Area (Monomer Plant)	Active	No	NFA	No
41	Spent Catalyst Storage Area (Maleic Warehouse)	Active	No	NFA	No
42	Roll-Off Bin at Latex Trench	Active	No	RFI	No
INCINERATOR:					
43	Waste Gas Incinerator*	Active	No	NFA	No

A - RFI
B - NFA
C - RFI
D - RFI
E - RFI
F - NFA
G - RFI

*Indicates PR - identified

whole is from the Evangeline Aquifer. This aquifer is typically wedge-shaped and has a high sand-clay ratio. Its individual sand layers are characteristically tens of feet thick.

The underlying Jasper aquifer generally has thick sands which yield large quantities of water but the groundwater may be highly mineralized or slightly saline (between 1,000 and 3,000 milligram per liter dissolved solids). Due to its quality, this aquifer remains little-used.

It should be noted that groundwater withdrawals in the Houston area are principally for municipal supply although small volumes are used by small industries and farms. In recent years, subsidence problems (7 feet since 1915) due to groundwater pumpage have led to the use of an increasing amount of surface water for municipal supply. In recent years, the Harris-Galveston Subsidence Control District has began issuing groundwater use permits that limit groundwater withdrawal. It has been reported that within a 2-mile radius of the facility no production wells for groundwater currently exist (63).

The facility groundwater monitoring system is comprised of seven RCRA monitoring wells. Four monitoring wells were screened in the sandy silt ("shallow silt") which is present at a general depth of +8 feet MSL; while one monitoring well was screened in the upper sand ("El-30 foot sand") and two monitoring wells were screened in the lower sand ("El-45 foot sand"). Hydraulic conductivity data was determined by a slug test method. Values ranged from 1.1×10^{-3} cm/sec to 4.7×10^{-3} cm/sec. No rate of flow was reported in the available data, but TWC estimated over 370 ft/yr (8).